

Minutes of the ALTOS Monitoring Board (MB) meeting #1.

People

CESBIO	LISAH	IRTA	UNICA	UCA
LARI	CNRS-L	INRGREF	SUP'COM	CERTE

INAT partially present - discontinuous connection because of regional troubles with power supply

Schedule

- Because of jet lag between Morocco and Lebanon, meeting is delayed by 30 minutes on next day (Tuesday) --> start @ 10:00 Paris time.
- It is necessary to check-up UCA contribution for each WP
- Obtaining PPT collection from each task leader → done.

Difficulties

- Lebanese partners were recently informed about grant reductions --> new grants are about 1000 € / partner for the whole project, which corresponds to
 - 97% reduction for CNRS-L / 93% reduction for LARI
→ ALTOS project leader will inform the PRIMA office for discussing consequences on project activities, in relation to the capabilities of Lebanese partners.
 - COVID-19 consequences
 - Difficulties in conducting current activities
 - KOM is delayed to (probably) next year. MB can gather every 2-3 months up to the KOM. This permits to monitor ongoing activities that relies on former materials, given that most experiments are delayed. → project manager will launch next MB meeting Doodle for meeting in 2-3 months.
 - Experiment delayed → we have to wait until next growing season → more than one-year extension (maybe more than 1 year because of incremental delay due to crop growing cycles).
 - Difficulties in hiring non-permanent staffs.
 - Less difficulties for IRTA
 - IRTA is essential service in the Spanish context, since related to food systems --> the work can go-on.
 - PhD student for three years (finished in 02/2023), Technician for 2 years.
 - Strong difficulties for UNICA.
 - Problem with non-permanent staffs already hired if project is delayed, since there is no possible contract extension. A solution is suspending contracts, but difficult for staffs.
 - Italian initiative by PRIMA PIs with message to funding bodies → « project members cannot work, we are asking for extension up to 1 year ».
- project leader will inform the PRIMA office → 12-18 months delay request.

Communication

- Web site with upload / download options to be launched in 1-2 months (on going implementation).

Data Management plan

- To be discussed with all partners in the following weeks → dedicated MB meeting.

Activity description on a Task basis.

- TK 1.1 Characterizing tree geometry - action 1
 - Partnership : IRTA + UCA
 - Object study : orchards and olive-yards in Spain and Morocco
 - Targets: fcover, LAI, row spacing
 - Methods:
 - RTM / NNT → challenges with heterogeneous canopies
 - 3D RTM and photogrammetry
 - Experiment :
 - Sentinel 2 data and airborne camera
 - Experiment can continue because IRTA is essential service. But in Morocco? → to be verified, after first data collection in the field in 2020.
 - TK 1.1 Characterizing tree geometry - action 2
 - Partnership : CESBIO + SFAX + IO,
 - Object study : rainfed olive tree in Taous, Tunisia
 - Targets: LIDAR, temperature, photochemical reflectance index
 - Methods:
 - DART 3D.
 - Means: PhD student and ALTOS post-doc.
 - TK 1.1 Characterizing tree geometry - conclusion:
 - Visio-conference to be planned between IRTA + UCA + CESBIO + SFAX + IO : methodological pooling and exchanges idea
 - Expected meeting minutes + roadmap if applicable.
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- TK 1.1 Characterizing aquifer geometry - action 1
 - Partnership : CERTE + LISAH
 - Object study : aquifer under the Lebna Dam, Tunisia
 - Target : aquifer geometry
 - Method: ongoing activities with geophysical measurements and stable isotopes for description of aquifer structure and flow pathway.
 - TK 1.1 Characterizing aquifer geometry - conclusion
 - Prospective on potential collaboration between LISAH, CERTE and UNICA.
 - Visio-conference to be planned between CERTE + UNICA + LISAH.
 - Expected meeting minutes + roadmap if applicable.
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- TK 1.1 Characterizing soil properties - prospective
 - Partnership : CERTE + LISAH + SUPCOM + INRGREF
 - Object study : soils within the Lebna watershed
 - Target : soil characterization (humidity, lithology, vegetation)
 - Method : synergy between optical satellite data / radar satellite data / geophysics / pedology
 - TK 1.1 Characterizing soil properties - conclusion
 - Prospective on possible methodological developments :
 - Visio-conference to be planned between LISAH, INRGREF, CERTE, SUPCOM.
 - Expected meeting minutes + roadmap if applicable.

- TK 1.1 Characterizing SSC variability - action 1
 - Partnership: CESBIO + LISAH + INAT
 - Object study: Tunisian soils
 - Target: soil surface characteristics according to Andrieux's typology.
 - Method :
 - From Sentinel-1 (microwave) & Sentinel-2 (solar spectrum) data
 - By classifying spatial elements according to spatial and temporal dynamics
 - To be validated with in-situ observations
- TK 1.1 Characterizing SSC variability - conclusion
 - Prospective on possible collaborations with UNICA who has some capabilities on this topic.
 - Visio-conference to be planned between (CESBIO + LISAH + INAT) and UNICA.
 - Expected meeting minutes + roadmap if applicable.
- TK 1.1 Characterizing climate forcing - action 1
 - Partnership: CERTE + LISAH (J .Carreau)
 - Object study: climate forcing over the Lebna Basin.
 - Method: assessment of climate change impact on extreme precipitation event.
- TK 1.1 Characterizing climate forcing - action 2
 - Partnership: SUPCOM + LISAH (J .Carreau)
 - Object study: Additional constrains in Stochastic Weather Generator with outcomes from meso-scale meteorological model about spatial variability.
 - Method: statistical approaches.
- TK 1.1 Characterizing climate forcing - action 3
 - Partnership: INRGREF + LISAH (J .Carreau)
 - Object study: operational method for stakeholders with gap-filling for meteorological records on operational sites

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- TK 1.2 Characterizing reservoir geometries - action 1
 - Objectives: using innovative method in photogrammetry and numerical vision for characterizing lac bathymetry and volume range --> providing rationale for scenarios of lac network design (size and density)
 - Method: photogrammetric processing of RS data using "point clouds" "Structure from motion" methods
 - Means
 - 1 MSc is ALTOS / LISAH granted. 1 other to be planned with external funds.
 - No more on inventory, to be conducted.
 - Partnership : LISAH + LARI + CNRS-L
 - Roadmap to be setup
- TK 1.2 Characterizing land use - action 1
 - Partnership: INRGREF + LISAH
 - Object study: characterizing crop rotations as drive by individual and collective rules
 - Methodological works: identification of drivers for crop rotations with field accessibility
 - Access to parcel according to environment feature (e.g. porosity)
 - Linear elements impact (road, gullies, wadis, benches) on crop rotation and spatial distribution over two crop cycles.
 - Available materials from former works :
 - Impact of parcel fragmentation, spatial patterns
 - Data: agricultural parcel, land use records, spot classification
 - Forthcoming works
 - Further characterization of watershed-wide distribution patterns
 - Classification images 2020
 - Geostatistical processing on classified images for the cycles 2015-2016 to 2017-2019
 - Identification of the structural physical elements of the landscape (infrastructure) that condition these same aggregates
- TK 1.2 Characterizing land use - action 2
 - Partnership: CESBIO + INAT.
 - Target: Seasonal land use maps twice a year with minimal data for real near time.
 - Means:
 - Data and method to be clarified, given it is focused on temporal signatures.
 - Two traineeships on Tensift and Merguellil
- TK 1.2 Characterizing land use - conclusion
 - Prospective on possible collaborations with SUP'COM
 - SUPCOM possible contribution: classification on area determination with SAR images. Few works for ancillary information. Need for in-situ data to be collected next year.
 - Visio-conference to be planned between INRGREF + LISAH + SUPCOM + CESBIO + INAT.
 - Expected meeting minutes + roadmap if applicable.

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- TK 1.2 Characterizing crop biomass - action 1
 - Partnership: INRGREF + SUPCOM
 - Former works:
 - Link between vegetation indices and aboveground biomass, based on coincident RS and field data. Several plots within the Lebna watershed.
 - 12 time series of S1 SAR Interferometry along with where height. Strong correlation between HV coherence and change in wheat height.
 - Forthcoming works:
 - Field campaign 2020-2021 (Engineer ALTOS)
 - Deeper analysis with Sentinel 2 and spatialization at Lebna watershed (PhD Eya Abdelghaffar 2020-2022)
 - Estimation of biomass with both sentinel 1 (collaboration with SupCom)
 - Concrete actions in forthcoming months: TerraSAR-X data for sensitive analysis → **INRGREF + SUPCOM have to fix the experiment and then plan the data collection according to satellite overpass.**
- TK 1.2 Characterizing chemical treatments / LISAH - action 1
 - Objectives: characterizing pesticide practices and farmer's choices
 - Method:
 - Field survey (pesticide contents in surface waters) and farmer interviews (pesticide uses) in accordance to land use and crop rotation
 - Means
 - 3 years of continuous monitoring within OMERE observatory.
 - 1 ongoing PhD from CHAAMS project
 - 1 forthcoming PhD from ALTOS
 - Partnership : INAT + LISAH
 - Roadmap
 - Ongoing data collection (Kamech scale)
 - Forthcoming data collection (Lebna scale)
 - Update of former data collection (Korba Irrigated perimeters)
 - Next stage is data processing including quality check.
 - Further stage is database setup and metadata for ALTOS web site (PM)
- TK 1.2 Characterizing hydrological connectivities - action 1
 - Objectives: characterizing surface hydrological connectivities
 - Method:
 - Numerical space segmentation with recent developments based on oriented tree typology and inclusion of areal / bulk elements
 - Means
 - Tools is ready : GrooveScape already design and implemented over a southern French watershed (French biodiversity agency project).
 - MNT products are ready
 - Partnership : INRGREF + LISAH
 - **Roadmap to be setup**

- TK 2.1 Monitoring ETR / Soil Moisture / Crop - action 1
 - Objectives: monitoring ETR, soil moisture and crop growth
 - Method: joint use of EC devices, SM moisture measurements, agricultural statistics
 - Means
 - relying on former and ongoing experiments within OMERE observatory
 - 1 ongoing PhD (MESRS / IRD) is gathering data.
 - Partnership: INRGREF + LISAH
 - Roadmap
 - Ongoing data gathering by PhD student
 - Next stage is database setup and metadata for ALTOS web site
- TK 2.1 Monitoring ETR / Soil Moisture / Crop - action 2
 - Means
 - Eddy covariance : Flux tower at Kamech watershed: subcatchment scale since 2010
 - Vegetation growth an average of 6 to 8 fields have been followed since 2016:
 - Hemispheric photos for LAI and crop cover, phenology, height, Biomass and yield
 - Soil moisture: only 2 fields were monitored 2019-2020
 - Monitoring of 8 fields (wheat, favabeans, fodder) of vegetation growth and soil humidity, biomass, yield
 - Remote sensing images sentinel 1 and sentinel 2, TerraSAR-X
 - PHD Abdelghaffar and Altos Engineer
- TK 2.1 Monitoring ETR / Soil Moisture / Crop - action 3
 - INRGREF + CESBIO
 - CTA dataset with PhD and engineer in collaboration with CESBIO --> link with FLUXMED and activities --> articulation between ALTOS and FLUXMED ?
 - ALTOS grant for contract staff --> tree flux Modeling
 - FLUXMED grants for contract staff --> spatialization
 - Existing overlaps between project clearly identified.
- TK 2.1 Monitoring ETR / Soil Moisture / Crop - action 4
 - Partnership : CESBIO + UCA
 - CESBIO will provide information about < about MOCTAR (Tensift) and TRISHNA (Taous) project.
- TK 2.1 Monitoring ETR / Soil Moisture / Crop - action 5
 - INAT will provide information about PhD Souissi on flowering
- TK 2.1 Monitoring ETR / Soil Moisture / Crop - action 6
 - Partnership : IRTA (methodological development site)
 - EC / lysimeter over irrigated orchard with different irrigation treatments
 - RS LST with sharpening.
 - Validation for pyTSEB with S-2 & S-3 RS data over heterogeneous canopies.
 - Multiscale data : satellite at different resolutions (Landsat, ECOSTRESS) + airborne imagery.
 - Ongoing experiment --> dataset ready next year --> metadata for ALTOS Web site next year
- TK 2.1 Monitoring ETR / Soil Moisture / Crop - action 7
 - Partnership : UNICA (methodological development site)
 - Pasture fields for animal feeding along with trees --> heterogeneous footprint.
 - Orroli site with EC and related measurements, including SAP flow devices
 - S-1 and S-2 dataset ready across irrigation and non-irrigation seasons.
 - This dataset to be used for methodological development about water transfer.
- TK 2.1 Monitoring ETR / Soil Moisture / Crop - conclusion
 - Emphasis on moisture --> CESBIO / UCA (MOCTAR on Tensift) + INAT / CESBIO (Merguellil) + UNICA (Orroli) --> subgroup to be setup on this item.

- TK 2.1 Monitoring Dam - Aquifer transfers - action 1
 - CESBIO + UCA
 - Groundwater refill of Haouz - Tensift basin, with a focus on Atlas contribution. No work on snowmelt, but consideration for surface and subsurface resulting flows. Snow contribution with fluxes from Atlas to Haouz plain. Aquifer refill below the Haouz plain from Atlas surface and subsurface flows, including snowmelt contribution (UCA slides from Said).
 - Hydrochemistry / isotopic monitoring.
 - VI contract on this topic.
- TK 2.1 Monitoring Dam - Aquifer transfers - action 2
 - LISAH + INRGREF
 - OMERE dataset on lake
- TK 2.1 Monitoring Dam - Aquifer transfers - action 3
 - LISAH + CERTE
 - Dam - aquifer exchanges
 - Ongoing PhD, several data analysis.
 - Dam leaks within the aquifer geometry
 - 3D EM data, to be linked with lithology.
- TK 2.1 Monitoring Dam - Aquifer transfers - conclusion
 - Visio-conference to be planned between UCA + CESBIO + LISAH + INRGREF + CERTE
 - methodological pooling and exchanges idea
 - investigate possible contributions from UNICA
 - Expected meeting minutes + roadmap if applicable.
- TK 2.1 Monitoring Chemical pollutants - action 1
 - Objectives: observing chemical content within surface and subsurface water fluxes, surface reservoirs and soils
 - Method: (1) in-situ experiments with passive samplers within soils, (2) laboratory experiment with soil column devices to determine adsorption characteristics.
 - Means
 - 1 ongoing PhD (CHAAMS).
 - 1 forthcoming PhD (ALTOS granted)
 - Former and ongoing experiments (1) within OMERE observatory / Lebna watershed and Korba irrigated perimeters and (2) within LISAH / ENIT based laboratory (LHYGES contribution)
 - Soil hydrodynamic parameters from former experiments
 - Partnership : INAT + LISAH
 - Roadmap
 - Ongoing data collection within upstream rainfed area
 - Forthcoming data collection on downstream Korba irrigated perimeters
 - Forthcoming soil column experiments on irrigated soils (salinity constraint)
 - Forthcoming stage is data processing including quality check.
 - Further stage is database setup and metadata for ALTOS web site (PM)
 - Difficulties
 - Cost of chemical analysis

- TK 2.2 Characterizing heterogeneities : action overview
 - Drip irrigation and ecophysiology --> hydraulic lift
 - RS data along with EB models
 - Partitioning T and E
 - Relevant data for modelling
 - Energy budget in relation to within canopy variability
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- TK 2.2 Characterizing canopy scale heterogeneities - action 1
 - IRTA
 - Vineyard
 - Sap-flows and HSR TIR data --> E_veg is measured with T_soil and T_veg --> E_soil is retrieved.
 - Variability in soil temperature --> consequence on flux estimation within TSEB
 - Forthcoming experiment. Protocol to be refined.
 - TK 2.2 Characterizing canopy scale heterogeneities - action 2
 - UCA + CESBIO
 - Trees & irrigated wheat
 - EC + Radar data for biomass + SM retrieval.
 - TK 2.2 Characterizing canopy scale heterogeneities - action 3
 - UNICA
 - Trees and understory
 - Hot-topic: agroforestry and pasture
 - Transect data with SM (potential), T(sap flow), resistivity in relation to root density and lithology (1 daily snapshot).
 - Ongoing result analysis.
 - Forthcoming: water distribution between trees and grass during grass season.
 - E / T partitioning in accordance to season (Montaldo AFM 2020).
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- TK 2.2 Characterizing landscape scale heterogeneities - action 1
 - UCA / CESBIO
 - Tensift
 - LAS on Atlas foot
 - TK 2.2 Characterizing landscape scale heterogeneities - action 2
 - LISAH / INRGREF
 - Kamech
 - Use RS for net radiation compilation at the scale of the Flux tower footprint.
 - --> contribution from PhD M. Dhouib ? To be discussed by INRGREF and LISAH.
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- TK 2.2 organization : creation of a task group
 - Experimental protocol and data analysis --> Rim and Gilles. Unformal.
 - UNICA & CERTE & UCA in geophysics.
 - IRTA, INRGREF, UNICA, CESBIO, UCA, INAT, SUPCOM --> evapotranspiration.
 - CESBIO, SUPCOM, UCA --> Microwave and TIR remote sensing.
 - Linking observation & modelling works on water fluxes in soil-plant-atmosphere continuum.
 - TK2.2 --> original protocol to be published along with dataset.
 - Linked to TK5.1 about data and method pool.

NOTA on TK 2.2 with SUPCOM proposition on “prospective about interferometry for subsidence due to groundwater exploitation” --> availability about human resources and grants, availability about competence for subsidence ? Difficult in the current proposal since (1) it requires additional resources and (2) it was not planned in the proposal

- TK 3.1 Modelling water fluxes within heterogeneous rooting systems
 - UNICA
 - Adding the hydraulic lift in relation to rocks and soils into the VDM model
- TK 3.1 Modelling Lebna Dam - aquifer exchanges.
 - Setting up coefficient exchanges in accordance to hydraulic gradient
- TK 3.1 Modelling ETR / SVAT with heterogeneity - action 1.
 - CESBIO
 - ISBA 1D already tested --> several shortcomings
 - New model based on 1D simplification (radiation, soil moisture) from 3D simulations with equivalent parameters
 - MAESPA 3D model used as reference since it is unique available model
 - Outcome : having a parsimonious model
 - ALTOS granted post-doc
- TK 3.1 Modelling ETR / SVAT with heterogeneity - action 2.
 - IRTA in vineyard and orchard
 - Wind profile within TSEB model
 - Stomatal response in SW and PT.
- TK 3.1 Modelling ETR / SVAT with heterogeneity - action 3.
 - INRGREF
 - SVAT modelling within Citrus orchard --> link with FLUXMED
- TK 3.1 Modelling ETR / SVAT with heterogeneity - action 4.
 - LISAH + INRGREF
 - kB-1
 - Work done, to be published.
- TK 3.1 Modelling pollutants flow - action 1.
 - Objectives: modelling the effect of pesticide practices on underground water contamination within irrigated perimeter
 - Method: Resolving two dimensional Richard’s equation (TDRE) over data from both soil column and field experiment + Using TDRE to simulate pollutant transport for different pesticide practices.
 - Means
 - Former NAILA works on TDRE inversion by means of soil columns experiments
 - HYDRUS-2D software
 - 1 PhD (ALTOS granted)
 - Partnership : INAT + LHYGES + LISAH
 - Roadmap to be setup